



Docket No.:

GR 99 P 2886

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By: 

Date: November 27, 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applicant : Johannes Edenhofer et al.

Applic. No.: 09/667,281

Filed : September 22, 2000

Title : Plug-In Connector for an Electrical Device

Examiner : Tho D. Ta - Art Unit: 2833

BRIEF ON APPEAL

Hon. Commissioner of Patents and Trademarks,
Washington, D. C. 20231,


S i r :

This is an appeal from the final rejection in the Office action dated May 20, 2002, finally rejecting claims 1, 2, 7-12 and 17-20.

Appellants submit this Brief on Appeal in triplicate, including payment in the amount of \$320.00 to cover the fee for filing the Brief.

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Real Party in Interest:

This application is assigned to Siemens Aktiengesellschaft of München, Germany. The assignment will be submitted for recordation upon the termination of this appeal.

Related Appeals and Interferences:

No related appeals or interference proceedings are currently pending which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of Claims:

Claims 1, 2, 7-12 and 17-20 are rejected and are under appeal. Claims 3-6, 13-15 and 16 were cancelled in an amendment filed February 27, 2002.

Status of Amendments:

No claims were amended after the final Office Action. A *Response under 37 CFR § 1.116* was filed on August 20, 2002. The Primary Examiner stated in an *Advisory Action* dated August 28, 2002, that the request for reconsideration had been considered but did not place the application in condition for allowance.

Summary of the Invention:

As stated in the first paragraph on page 1 of the specification of the instant application, the invention relates to a plug-in connector of an electrical device with contact pins which are embedded in a plastic member.

Appellants explained on page 7 of the specification, line 20, that, referring now to the figures of the drawings in detail and first, particularly, to Fig. 1 thereof, there is shown an electrical device and, in particular, a control device to be used in automotive technology, with a plug-in connector. The housing of the control device is not illustrated.

Appellants outlined on page 8 of the specification, line 1, that the plug-in connector is fastened on a printed circuit board 3. The printed circuit board 3 is fitted with electrical components 4 which are to be protected against an electrostatic discharge.

Appellants further outlined on page 8 of the specification, line 6, that Fig. 2 shows contact pins 1 which are embedded in a plastic member or plastic body 2 of the plug-in connector.

It is also stated on page 8 of the specification, line 9, that the contact pins 1 are covered in a form-fitting or

form-locking manner along the axes of the contact pins by a material 21 which has conducting properties in a range above 100 volts and has non-conducting properties in a range below 100 volts.

It is further described on page 8 of the specification, line 15, that the material 21 can, for example, be a casting resin which is mixed with 7 to 15 percent by weight of carbon powder. In this example, the material 21 is formed of a polymer mixture based on polypropylene and 8.5 percent by weight of carbon powder. The polymer mixture has an electrical surface resistance of approximately 1000 Ohms.

Appellants stated in the last paragraph on page 8 of the specification, line 22, that chips or slivers of stainless steel or high-grade steel can be added to the insulating material instead of carbon powder. In this case, generally no glass fiber components are added to the plastic.

Appellants outlined on page 9 of the specification, line 1, that a plug-in connector with an additional conducting face or conductive surface 5 is illustrated in Fig. 3. The conductive surface is in this case a metal foil.

Appellants further explained on page 9 of the specification, line 5, that Fig. 4 shows the conductive surface 5 with defined spacings d from the contact pins 1. The contact pins 1 are covered in a form-fitting or form-locking manner by the material 21 which is electrically conducting as a function of voltage.

It is also explained on page 9 of the specification, line 10, that the voltage at which the material 21 becomes conductive can be set via the spacing d . The conductive surface 5 makes electric contact with a contact pin responsible for dissipating the electrostatic charge. Individual spacings d can be set between the contact pins 1 and the conductive surface 5 for the individual contact pins. It is thereby possible to effect different triggering voltages for the individual contact pins in a plug-in connector. In the case of this embodiment, the triggering voltage is a function of the smallest spacing between the contact pin 1 and the conducting surface 5.

It is described in the last paragraph on page 9 of the specification, line 21, that the polymer mixture based on propylene with the carbon powder is distinguished by good conductivity when the breakdown voltage is reached, and by

small leakage currents. The plug-in connector also has good mechanical properties and is suitable for flow-soldering.

References Cited:

U.S. Patent No. 5,181,864 (Wakino et al.), dated January 26, 1993.

Issues

1. Whether or not claims 1, 2, 7-12, and 17-20 are obvious over Wakino et al. (U.S. Patent No.5,181,864) under 35 U.S.C. §103.

Grouping of Claims:

Claims 1 and 11 are independent. Claims 2 and 7-10 depend on claim 1. Claims 12 and 17-20 depend on claim 11. The patentability of claims 2, 7-10, 12, and 17-20 is not separately argued. Therefore, claims 2, 7-10, 12, and 17-20 stand or fall with claims 1 and 11.

Arguments:

Claims 1 and 11 call for, inter alia:

"a plastic member including a material being a mixture of a plastic and a carbon powder, having conductive properties at voltages above a given working voltage range and having insulating properties at voltages in the given working voltage range".

The Wakino et al. reference discloses a plug-in connector, comprising a housing material formed of plastic to which 50-90% of semiconductor material is added, so that the entire housing has the characteristic of a varistor. A varistor is an active component, which has the construction of a capacitor. The Wakino et al. reference also discloses that the housing is covered by a grounding plate (Fig. 1).

Furthermore, the exemplary embodiments in Wakino et al. therefore also have electrodes (Figs. 1, 5, and 6; symbols 9 and 29). Even though in Fig. 3 an exemplary embodiment is illustrated without an additional electrode 9, it is expressly stated that this exemplary embodiment has less reliable electrical characteristics than the other exemplary embodiments (column 3, lines 7-12).

The reference does not show or suggest a plastic member including a material being a mixture of a plastic and a carbon powder, having conductive properties at voltages above

a given working voltage range and having insulating properties at voltages in the given working voltage range, as recited in claims 1 and 11 of the instant application. Wakino et al. disclose a housing made up of plastic and 50-90% of expensive semiconductor material so that the housing has varistor characteristics. Due to this high ratio of expensive varistor material, the plug-in connector has a heavy weight and the housing material loses its plastic characteristic. The housing also becomes porous and brittle. In the embodiments according to Figs. 5 and 6, the housing is only formed of plastic, but the varistor material and the grounding plate covering the housing must be added in additional production steps, thereby adding to the size of the connector. This is contrary to the invention of the instant application, in which the housing of the plug-in connector containing the contact pins is formed of a homogeneous material made of plastic and a certain percentage of carbon powder (or filings of precious metal), which is not a varistor material.

It is the object of the present invention to provide a plug-in connector of an electrical device, which has protection from electro-static discharges, which can easily be manufactured and does not require additional installation space. This object is solved with a passive component, i.e.

with an insulator, the electrical conductivity of which is increased by the addition of carbon powder. Due to the increased conductivity of the plug-in material, the breakdown voltage of the material is reduced. If a voltage appears which is greater than the breakdown voltage, due to an electrostatic discharge, the same is deflected.

The object of the invention of the instant application pertains to a simple passive insulator, the electrical conductivity of which is "adjusted" to a desired value by the addition of carbon powder. This is contrary to the object of the Wakino et al. reference, which requires the characteristics of an active component. Therefore, there is no motivation for a person of ordinary skill in the art to modify the Wakino et al. reference with the material having the properties as disclosed in the invention of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest a plastic member including a material being a mixture of a plastic and a carbon powder, having conductive properties at voltages above a given working voltage range and having insulating properties at voltages in the given working voltage range, as recited in claims 1 and 11 of the

instant application. Claims 1 and 11 are, therefore, believed to be patentable over the art and since all of the dependent claims are ultimately dependent on claims 1 or 11, they are believed to be patentable as well.

The honorable Board is therefore respectfully urged to reverse the final rejection of the Primary Examiner.

Respectfully submitted,

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For Appellants

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Appendix - Appealed Claims:

1. A plug-in connector for an electrical device, comprising:

a plastic member including a material being a mixture of a plastic and a carbon powder, having conductive properties at voltages above a given working voltage range and having insulating properties at voltages in the given working voltage range; and

contact pins embedded in said plastic member.

2. The plug-in connector according to claim 1, wherein:

said material is disposed in a form-fitting manner around said contact pins;

said plastic member has a conducting surface; and

said conducting surface electrically contacts said material and is disposed at a respective spacing distance from said contact pins.

7. The plug-in connector according to claim 1, wherein:

said plastic member includes a base material; and

said material is a mixture of said base material and a carbon powder.

8. The plug-in connector according to claim 2, wherein:

said plastic member includes a base material; and

said material is a mixture of said base material and a carbon powder.

9. The plug-in connector according to claim 1, wherein said material includes between 5 and 15 percent by weight of said carbon powder.

10. The plug-in connector according to claim 1, wherein said plastic member includes a crystalline component and a noncrystalline component.

11. In combination with an electrical device having electrical components, a plug-in connector, comprising:

a plastic member including a material being a mixture of a plastic and a carbon powder, having conductive properties at voltages above a given working voltage range and having

insulating properties at voltages in the given working voltage range; and

contact pins embedded in said plastic member.

12. The plug-in connector according to claim 11, wherein:

said material is disposed in a form-fitting manner around said contact pins ;

said plastic member has a conducting surface; and

said conducting surface electrically contacts said material and is disposed at a respective spacing distance from said contact pins.

17. The plug-in connector according to claim 11, wherein:

said plastic member includes a base material; and

said material is a mixture of said base material and a carbon powder.

18. The plug-in connector according to claim 12, wherein:

said plastic member includes a base material; and

said material is a mixture of said base material and a carbon powder.

19. The plug-in connector according to claim 11, wherein said material includes between 5 and 15 percent by weight of said carbon powder.

20. The plug-in connector according to claim 11, wherein said plastic member includes a crystalline component and a non-crystalline component.